Short Safety Subject

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Fluid Replacement

A survey conducted a survey of 3,003 Americans which revealed that consumers are drinking nearly eight daily servings of hydrating beverages (water, milk, juice, decaffeinated soft drinks) per day.

One would think that this is pretty good news; however, according to this survey, Americans are also consuming approximately five servings of caffeine or alcohol-containing beverages per day as well. These beverages counter the benefits of the hydrating process and actually cause us to lose or eliminate water.

The bottom line is that Americans, on the average, are getting only about one-third of the hydrating benefits actually needed to function optimally. One can appreciate these findings even more if you add jump boots, a battle dress uniform, rucksack, helmet, and a weapon and then place that person in an environment where heat is the major medical threat. Or you add three to five hours of mandatory physical fitness training per week at their home station and include various other physically demanding activities not typically performed by the general population. It doesn't sound too good now.

Yesterday morning as I was getting out of my car, I noticed that the person who had parked in the space next to me was fumbling with a large bag of what he told me was coffee and related supplies. He said it was his day to supply the coffee for his office and that he'd better not be late. I laughed and we joked a bit more about the importance of maintaining a proper, congenial office environment. "Save the hostilities and direct those toward the enemy," I said. We laughed a bit more and he hurried off to deliver the goods.

We, who wear the green suit, readily admit that coffee is the beverage of choice for the average "baby-boomer" soldier as the soft drink is probably the beverage of choice for our younger "Generation X" soldier. But do we realize that caffeine (either from coffee or cola) not only promotes dehydration, but it can affect one's blood pressure, circulation, digestion, kidneys, and most other body processes?

The survey mentioned above further revealed that two-thirds of the respondents said they were aware of the recommendation to consume eight 8-ounce glasses of water per day, but half of them admitted to only consuming around four. In fact, the average American consumes only 4.6 servings of water a day, with only 20 percent of all Americans consuming the recommended eight 8-ounce glasses per day as directed by the medical community. An alarming 9 percent polled for this survey said that they drink no water at all. Forty-seven percent reported that they did not know that the human body loses as much water when asleep as when awake and 10 percent reported that they usually wait until they feel thirsty before they consume some type of liquid.

So why should we care about the rehydration (fluid replacement) habits of the average American citizen? One reason is that our military is merely a microcosm of the larger society we call the United States of

America. And one of the behaviors that Army leaders first attempt to modify is the frequency young soldiers rehydrate themselves while performing physical activity. Nowadays you won't hear a drill sergeant say, "Down your canteen. Turn it upside down and let me see that it's empty!" We now know that it is possible to drink too much water. And its effect can be just as detrimental as drinking too little water. Forced hydration, to that extreme, is a thing of the past. However, depending on the heat category and the workload, you will still see drill sergeants stop a group of young recruits and require them to drink 1/2 to 1 full quart of water per hour.

So how do we, as soldiers and leaders, promote safe, effective means of maintaining proper hydration at work and during recreation activities? The first step is to understand hydration or better yet, dehydration.

Dehydration - What is it?

Dehydration is an abnormal depletion of body fluid. Loss of water through such processes as sweating, breathing, or the elimination of body waste, must be replaced. Therefore, it is essential that particular attention be given to how we meet our daily water needs.

Dehydration never happens rapidly. It is a process that occurs over time and is the major contributor to heat illness. Acute or mild dehydration (equivalent to 2-3 percent of one's body weight) can reduce physical capacity and heat tolerance. As dehydration progresses, one's physical capacity further degrades with cognitive function and the body's ability to regulate heat (i.e., sweating) becomes seriously compromised. If this dehydration process continues and reaches 5-6 percent of body weight, total body functioning is affected.

Your Body Needs Water.

A water loss of merely 1 percent of body weight (1.8 pounds for a 180-pound soldier) could raise the body's core temperature and increase the risk of heat exhaustion and stroke. As body temperature rises, muscles fatigue and exercise performance declines by 20 to 50 percent. And remember this is only mild dehydration!

It is not uncommon for soldiers and leaders to voluntarily dehydrate themselves, often boasting that they have trained their bodies to go all day without water. This is simply not true. Other soldiers may, upon arriving in a hot environment limit their water intake thinking that this will hasten acclimatization. In fact, soldiers should consume large quantities of water, moderate their work/rest schedules, and consume adequate rations to replace depleted salt due to sweating. Water losses in hot environments can reach 15 liters per day per soldier!

Other Ways to Meet Your Daily Water Needs.

Don't wait until you are thirsty to consume water. In hot environments, thirst is not stimulated until the body has lost two or more cups of total body water. Therefore, if a soldier is only drinking water when they feels thirsty, they are operating at close to a 2 percent dehydrated state at all times.

Drink plenty of water throughout the day, whether at work or play. Keeping a conveniently placed water bottle on one's desk, on the sideline, or in the gym bag will encourage water consumption.

Drink decaffeinated beverages, especially in hot environments. Caffeine is a diuretic and causes more frequent urination. Avoid or limit alcoholic beverages as well.

Don't underestimate the amount of water lost through exercise or strenuous activities. A good rule of thumb is to drink 16 ounces of water for every pound of body weight you lose through those activities. Remember that you must also consume water during these activities as well.

Start and end the day with a serving of water. The body loses water during sleep. So before heading off to morning PT, it's a great idea to consume at least 8 ounces of water. Drink another seven servings of water throughout the day. Remember that your requirements for water will increase with your activity level.

Soldiers with fever due to illness or immunization may be more susceptible to heat stress. Ensure that medical supervision is provided and that adequate water consumption is afforded.

Consume cool water instead of ice-cold or warm fluids/water. Cool water is absorbed much more quickly than ice-cold water and it also has more of a cooling effect on the body than warm to hot liquids (i.e., coffee, tea).

Bottom Line.

Rehydration is the key to preventing heat-related illness or injuries. The body's thermoregulation system operates in a very narrow range of temperatures. Mild dehydration can raise the core temperature enough to affect the body's ability to dissipate heat. Simply replacing lost fluids in a manner that is consistent with workload and existing heat categories can minimize or eliminate the effects of this health threat.

Today's soldiers are constantly making beverage choices based on habit and/or tradition. Choosing the correct beverage is just as important as the frequency of consumption. The next time you reach for your second cup of morning coffee, think about its effects on your body. Then, instead of pouring a cup of Joe, pour a cup of water. You'll thank me.

Fluid Replacement Guidelines for Warm-Weather Training
(Average Acclimated Soldier Wearing BDU, Hot-Weather

		Easy Work		**Moderate Work**		**Hard Work**	
Heat Category	WBGT Index OF	Work/Rest	Water Per Hour	Work/Rest	Water Per Hour	Work/Rest	Water Per Hour
1	78-81.9	No limit	1/2 qt	No limit	3/4 qt	40/20 min	3/4 qt
2 (Green)	82-84.9	No limit	1/2 qt	50/70 min	3/4 qt	30/30 min	1 qt
3 (Yellow)	85-87.9	No limit	3/4 qt	40/20 min	3/4 qt	30/30 min	1 qt
4 (Red)	88-89.9	No limit	3/4 qt	30/30 min	3/4 qt	20/40 min	1 qt
5 (Black)	>90	50/70	1 qt	20/40 min	1 qt	10/50	1 qt

*Rest means minimal physical activity (sitting or standing) and should be accomplished in the shade if possible

Note 1: The work (rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Individual water needs will vary +/- 1/4 quart per hour.

Note 2: CAUTION: Hourly fluid intake should not exceed 1 1/2 quart per hour.

Note 3: Wearing body armor adds % to WBGT Index.

Note 4: MOPP gear adds 10 F to WBGT Index.

Examples:

Easy Work	**Moderate Work**	**Hard Work**
• Walking hard surface at 2.5 mph, ≤30-pounds load • Weapon maintenance • Manual of arms • Marksmanship training • Drill and ceremony	• Walking hard surface at 3.5 mph, ≤40-pound load • Walking loose sand at 2.5 mph, no load • Calisthenics • Patrolling • Individual movement techniques; i.e., low crawl, high crawl • Defense position construction • Field assaults	• Walking hard surface at 3.5 mph, ≥40-pound load • Walking loose sand at 2.5 mph with load

Note: Soldiers who are overweight, dieting, or post heat casualties are more prone to heat injuries. As a result, their activities must be closely monitored.